

App. No. 10/718,961

Reply to Office action of January 18, 2006

REMARKS/ARGUMENTS

A. Summary of the Amendment

This is a full and timely response to the final Office Action dated January 18, 2006. Reexamination and reconsideration are courteously requested. By way of the present amendment, claims 1, 9, and 20 are amended to include the features of dependent claims 8, 16, and 23, respectively. Claims 8, 16, and 21 to 23 are canceled. No claims are added, and no claims have been withdrawn as the result of a restriction requirement. Thus, claims 1 to 7, 9 to 15, 17 to 20, and 24 remain pending for the Examiner's consideration, with claims 1, 9, and 20 being independent claims.

B. Rationale for Entry of the Present Amendment Under Rule 116

By way of the current amendment, claims 1, 9, and 20 are amended to include the features of dependent claims 8, 16, and 23, respectively. Thus, no new issues are raised by the present amendment, and no claims are added. Further, a typographical error in claim 9 is corrected, thus placing the claims in better form. For these reasons, the present amendment is compliant with Rule 116, and entry of the amendment is respectfully requested.

C. Rejections Under 35 U.S.C. § 102(b)

Claims 20 to 21, and 24 are rejected as being anticipated by U.S. Patent No. 5,322,666 (Watwe). These rejections are moot since the present amendment incorporates the features of claim 23 into independent claim 20. The rejection of claim 22 under 35 U.S.C. § 103(a) based on Watwe is also moot for the same reason.

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D. Rejections Under 35 U.S.C. § 103(a)

Claims 1 to 24 are rejected as being unpatentable over U.S. Patent No. 5,745,834 (Bampton) in view of U.S. Patent No. 3,950,166 (Obara) and U.S. Patent No. 5,640,667 (Frietag). These rejections are respectfully traversed.

Claims 1 and 9 recite that during a selective laser sintering method, a powder blend includes a titanium-including base metal having a first melting temperature, and an alloying metal that has a second melting temperature. The claims also recite that the powder blend does not include a carbon based polymer. In a selective laser sintering process, there are two main ways to bind titanium-including metals. One way is to include a carbon-based polymer binder, such as vinyl, which readily melts and captures the titanium metals or alloys. Another way is to heat the titanium metal or alloy to its melting temperature, causing the metal to form a solid layer when it cools. In contrast, the present invention uses a low melting temperature metal in place of a polymer binder to dissolve the titanium metal or alloy and capture it upon re-solidification.

The cited prior art fails to disclose a powder blend having the composition defined in the independent claims. More particularly, the prior art fails to teach or suggest a titanium-including base metal, a lower melting point metal, and an absence of carbon based polymer. In the Office Action, the Examiner asserts that Bampton, at col. 2 lines 37-41, suggests that a polymer binder is not necessary when a simple shape is being constructed using selective laser sintering. Such a characterization of Bampton is simply inaccurate. Bampton only discloses powder blends for selective sintering processes that include polymer binders. The overall process is taught as being advantageous when building complex components, but Bampton does not attribute the advantage merely to the binder. In fact, Bampton clearly teaches in the passage cited by the Examiner that the binder alone does not solve the problem of additional supports that are necessary when building with a polymer-containing powder blend. A person of ordinary skill in the art would in no way be motivated by the teachings of Bampton to remove a polymer binder from the powder blend during a selective laser sintering process.

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Further, the Examiner asserts that Freitag discloses a selective laser sintering process in which metal powders are bound without the use of a polymer binder. However, Freitag is directed to a method like the second prior art method discussed above in which the base metal itself is heated and bound upon cooling. Freitag does not use a polymeric or metal binder, but instead laser sinters the base powder first at a low energy "in a manner as to bind the particles of powder ..., but not to such an extent as to form a fully-dense metal portion thereat" (col. 6, lines 55 to 58). Then, Freitag performs selective laser sintering at the periphery of the bound metal to form a skin that maintains the component shape during a subsequent global heating process (col. 7, lines 20 to 52). Thus, a person of ordinary skill in the art would not be motivated by reviewing Freitag to use "an alloying metal having a second melting temperature lower than said first melting temperature" in place of a polymer binder, particularly when the base metal is a titanium-containing metal.

Finally, claim 20 recites a powder blend including 1) a base metal of titanium or alloy thereof, the base metal having a first melting temperature; and 2) an alloying metal having a second melting temperature lower than the first melting temperature, and including a Ti-Cu-Ni alloy at a concentration ranging between about 10 wt.% and about 30 wt.%, said Ti-Cu-Ni alloy being about 15% Ni and about 15% Cu, with the balance being Ti. None of the prior art references teaches or suggests such a powder blend. The closest reference is perhaps Obara since Cu, and Ni are discussed as potential additives to a titanium-based powder. However, nowhere in Obara is there a teaching or suggestion that the powder include powders of a titanium alloy, and specifically the titanium alloy recited in claim 20.

E. Conclusion

In view of Applicant's amendments and remarks, it is respectfully submitted that Examiner's objections and rejections have been overcome. Accordingly, Applicants respectfully submit that the application is now in condition for allowance, and such allowance is therefore earnestly requested. Should the Examiner have any questions or wish to further discuss this

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application, Applicants request that the Examiner contact the Applicants attorneys at the below-listed telephone number.

If for some reason Applicants have not requested a sufficient extension and/or have not paid a sufficient fee for this response and/or for the extension necessary to prevent abandonment on this application, please consider this as a request for an extension for the required time period and/or authorization to charge Deposit Account No. 50-2091 for any fee which may be due.

Respectfully submitted,

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Dated: March 17, 2006

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